We claim

1. Apparatus for edge detection comprising:

- means for receiving an image signal;
- means for first detecting whether a second derivative of the image signal crosses zero;
- means for, in response to a positive result from the first means for detecting, second detecting whether a first derivative of the image signal is greater than a first threshold;
- means for, in response to a positive result from the second means for detecting, third detecting whether an indication of an edge frequency is meets a predetermined criterion; and
- means for supplying an edge identification in response to a positive result from the third means for detecting.

2. The apparatus of claim 1, wherein

- the image signal comprises a luminance signal;
- the indication of the edge frequency is a ratio between a third derivative of the luminance signal and a first derivative of the luminance signal; and
- the predetermined criterion is whether the ratio is greater than a threshold.

3. The apparatus of claim 2, wherein the third derivative is low-pass as a result of being calculated from a low-pass second derivative.

4. The apparatus of claim 1, wherein the image signal results from a vertical scan of an image, and the edge identification corresponds to a horizontal edge.

5. The apparatus of claim 1, wherein the image signal results from a horizontal scan of an image, and the edge identification corresponds to a vertical edge.

6. The apparatus of claim 1, wherein the image signal comprises a luminance signal and the second derivative is a low-pass second derivative.

7. The apparatus of claim 1, wherein the image signal is a luminance signal and the first derivative is a low-pass first derivative.

8. The apparatus of claim 1, comprising a medium, readable by a data or signal processing device, embodying code adapted to effect the listed operations.

9. The apparatus of claim 1, comprising at least one special purpose hardware unit adapted to perform the listed operations.

10. The apparatus of claim 9, further comprising a separate respective special purpose hardware unit adapted to perform each of the detecting operation.

11. The apparatus of claim 1, wherein the image is a video image and the image signal is a luminance signal.

12. The apparatus of claim 1, wherein the second derivative is a low pass second derivative resulting from a convolution between a second derivative operator and an operator corresponding to a low pass filter.

13. The apparatus of claim 12, wherein the operator corresponding to the low pass filter is of the form [1, 2, ..., m, ..., 2, 1], where m is an integer variable relating to an up-scaling factor applied to the video signal prior to edge detection.

14. The apparatus of claim 13, wherein an operator corresponding to the low pass second derivative is of the form [-1, 0, 0, 0, 2, 0, 0, -1]

15. The apparatus of claim 1, wherein the first derivative is a low-pass derivative resulting from a convolution between a derivative operator and an operator corresponding to a low pass filter. ~~The apparatus of claim 12, wherein the low pass filter is of the form [1, 1, ..., 1].~~

16. The apparatus of claim 1, further comprising an edge linking unit.

17. Image processing apparatus comprising:

- an input for receiving an image related signal;
- a means for effecting a combined low pass filter and derivative operation, without separating the two operations; and
- an output for providing a result of the combined low pass filter and derivative operation.

18. The apparatus of claim 17 wherein the derivative is a second derivative.

19. The apparatus of claim 18, wherein the derivative is a first derivative.

20. A method for edge detection comprising executing the following operations in a data or signal processing device:

- receiving an image signal;
- first detecting whether a second derivative of the image signal crosses zero;
- in response to a positive result from the first detecting, second detecting whether a first derivative of the image signal is greater than a first threshold;
- in response to a positive result from the second detecting, third detecting whether an indication of an edge frequency meets a predetermined criterion; and
- supplying an edge identification in response to a positive result from the third detecting.

21. The method of claim 20, wherein

- the image signal comprises a luminance signal ;
- the indication of the edge frequency is a ratio between a third derivative of the luminance signal and a first derivative of the luminance signal; and
- the predetermined criterion is that the ratio is greater than a threshold.

22. The method of claim 21, wherein the third derivative is low-pass as a result of being calculated from a low-pass second derivative.

23. The method of claim 20, wherein the image signal results from a vertical scan of an image, and the edge identification corresponds to a horizontal edge.

24. The method of claim 20, wherein the image signal results from a horizontal scan of an image, and the edge identification corresponds to a vertical edge.

25. The method of claim 20, wherein the image signal comprises a luminance signal and the second derivative is a low-pass second derivative.

26. The method of claim 20, wherein the image signal is a luminance signal and the first derivative is a low-pass first derivative.

27. The method of claim 20, comprising effecting the operations in response to a medium, readable by the data or signal processing device and embodying code.

28. The method of claim 20, comprising effecting the operations in at least one special purpose hardware unit.

29. The method of claim 20, wherein the at least one special purpose hardware unit comprises a separate respective special purpose hardware unit adapted to perform each of the detecting operations.

30. The method of claim 20, wherein the image is a video image and the image signal is a luminance signal.

31. The method of claim 20, wherein the second derivative is a low pass second derivative resulting from a convolution between a second derivative operator and an operator corresponding to a low pass filter.

32. The apparatus of claim 31, wherein the operator corresponding to the low pass filter is of the form [1, 2, ..., m, ..., 2, 1], where m is an integer variable relating to an up-scaling factor applied to the video signal prior to edge detection.

33. The method of claim 32, wherein an operator corresponding to the low pass second derivative is of the form [-1, 0, 0, 0, 2, 0, 0, -1]

34. The apparatus of claim 20, wherein the first derivative is a low pass derivative resulting from a convolution between a derivative operator and an operator corresponding to a low pass filter. The apparatus of claim 12, wherein the low pass filter is of the form [1, 1, ..., 1].

35. The method of claim 20, further comprising an edge linking unit.

36. Image processing method comprising executing the following operations in a data processing device:

- receiving an image related signal;
- effecting a combined low pass filter and derivative operation, without separating the two operations;
- providing a result of the combined low pass filter and derivative operation.

37. The method of claim 36, wherein the derivative is a second derivative.

38. The method of claim 36, wherein the derivative is a first derivative.

39. Edge detection apparatus comprising:

- an input adapted to receive an image signal;
- processing apparatus adapted
  - to detect at least one edge in the image signal; and
  - to distinguish edges having higher frequency content from edges having lower frequency content; and
- an output arranged to supply an edge detection indication only in response to edges having higher frequency content.